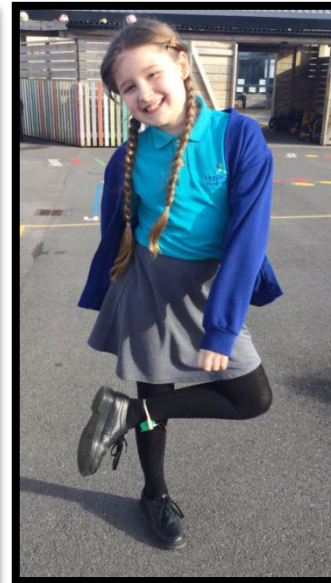




I am a Computer Scientist

I am a computer scientist. I study computers and computing, including their theoretical and algorithmic foundations, hardware and software, and their uses for processing information. As a computer scientist, I am developing innovative ways of exploring information, and what I can do with it: enhancing my own thinking skills through algorithms, logic, visualisation, precision, and abstraction. I understand that computational thinking involves and illuminates other disciplines and the collaboration of these are vital, when addressing the advances in technology, and the inventive ways to use it. I am interested in pushing the boundaries of invention and transformation, using technology to creatively solve problems around me.



	Key Concepts	Contexts
What is computing? Algorithms have been used for around 4000 years, with evidence in Sumerian tablets displaying examples of division. People have used tools, such as an abacus, to help with logical thinking for 2000 years. Over time, these tools and algorithms have developed in complexity and the first modern computer was designed by Charles Babbage in the 1820s and 30s. Slow and massive machines have developed into more efficient and compact devices we know today. The versatile nature of this technology means that it is in constant use and is ever changing but in essence runs on similar mathematical principles as the original machines. The study and use of these machines and their algorithms is computer science.	Computer components and resultant hardware Computers are electronic devices used for storing or processing data (information). They can be used by inputting, storing, and outputting data. To do this, computer programs are written by coders (programmers) and can be very sophisticated. Therefore, computers do not think and cannot make decisions by themselves, rather the software (programs to do a specific job) enables users to interact to give (input) and receive (output) data.	Y1: Technology around Us and Grouping Data Y2: IT around Us and Pictograms Y3: Connecting Computers and Branching Databases Y4: The Internet and Data Logging Y5: Systems and Searching and Flat-File Databases Y6: Communication and Collaboration and Introduction to Spreadsheets
	Digital Literacy relates to having functional IT skills, which support the creation or presentation of content. To be digitally literate is to have access to a broad range of practices and cultural resources that you are able to apply to digital tools. It is the ability to make and share meaning in different modes and formats; to create, collaborate and communicate effectively and to understand how and when digital technologies can best be used to support these processes.	Y1: Digital Painting and Digital Writing Y2: Digital Photography and Digital Music Y3: Stop Frame Animation and Desktop Publishing Y4: Audio Production and Photo Editing Y5: Video Production and Vector Graphics Introduction Y6: Web Page Creation and 3-D Modelling
	Computational Thinking • Understanding and using algorithms: a sequence of specific, ordered instructions to complete a task • De-bugging: finding and resolving bugs (defects or problems that prevent the correct operation) • Abstraction: removing or filtering out all unnecessary information to focus on what we need to solve a problem • Decomposition: breaking down a problem into smaller, easier to solve parts • Pattern Recognition: recognising patterns within outcomes	Y1: A robot and Programming Animations Y2: Robot Algorithms and Programming Quizzes Y3: Sequencing Sounds and Events and Actions in Programs Y4: Repetition in Shapes and Repetition in Games Y5: Selection in Physical Computing and Selection in Quizzes Y6: Variables in Games and Sensing Movement
	Technology should be used safely, respectfully, and responsibly. Electronic safety (e-safety) incorporates: • Safe, respectful, responsible use of technology • Identifying dangers • Know where or who to contact if they have concerns	E-safety is explicitly taught within the CLF I am Citizen /PSHE curriculum. Opportunities to develop pupils e-safety are expected to be referred to within the teaching of Computer Scientists.

Year 1 Key Concepts, Knowledge, Vocabulary and Skills

Key Concept				
Computer components and resultant hardware	Key Knowledge	Skills/Learning Objectives	Vocabulary	Ideas for Great Task Design
	Technology around us - Know that technology is something that can help us. - Know how examples of technology help us. - Recognise that a computer is an example of technology. - Recognise that choices are made when using technology. - Know why rules are needed when using technology.	- I can locate examples of technology in the classroom. - I can switch on and log into a computer - I can use a mouse to click and drag objects on a screen. - I can save my work on a computer. - I can edit my text and delete letters - I can show how to use the internet safely	technology, computer, mouse, trackpad, keyboard, screen, double-click, typing	NCCE Computing systems and networks – technology around us https://teachcomputing.org/curriculum/key-stage-1/computing-systems-and-networks-technology-around-us Hardware/software: Digital devices with a keyboard and a mouse. Free program - paintz.app
	Grouping data - Know attributes of an object. - Recognise that objects can be counted. - Recognise the properties of an object. - Know that information can be presented. - Recognise that information can be presented in different ways.	- I can describe objects using labels. - I can group objects and count a group of objects. - I can describe and find objects with similar properties. - I can group objects in more than one way. - I can choose how to group objects. - I can decide how to group objects to answer a question and record what I have found.	object, label, group, search, image, property, colour, size, shape, value, data set, more, less, most, fewest, least, the same	NCCE Data and information – grouping data https://teachcomputing.org/curriculum/key-stage-1/data-and-information-grouping-data Hardware/software: You will need digital devices for learners to interact with during this unit. Learners will be logging on to the computers, opening and saving documents.
Digital Literacy relates to having functional IT skills, which support the creation or presentation of content.	Key Knowledge	Skills/Learning Checkpoints	Vocabulary	Ideas for Great Task Design
	- Know what different freehand tools do - Recognise computers can be used to create art - Recognise tools can be adjusted to suit need - Compare computer painting with using brushes	- I can use freehand tools for painting - I can use shape and line tools - I can choose appropriate shapes and colours - I can choose appropriate paint tools - I can use correct colour and brush tools - I can spot differences between painting on a computer and paper	paint program, tool, paintbrush, erase, fill, undo, shape tools, line tool, fill tool, undo tool, colour, brush style, brush size, pictures, painting, computers	NCCE Creating media – digital painting https://teachcomputing.org/curriculum/key-stage-1/creating-media-digital-painting Hardware/software requirements: Microsoft Paint or paintz.app
	- Recognise that a keyboard is used to enter text - Recognise that shift key changes output - Recognise that text can be changed - Recognise that appearance of text can change	- I can use a computer to write - I can add and remove text - I can type capital letters; use bold, italic and underline - I can dragging and clicking and changing font - I can undo changes to text - I can explain differences between typing and writing	word processor, keyboard, keys, letters, type, numbers, space, backspace, text cursor, capital letters, toolbar, bold, italic, underline, mouse, select, font, undo, redo, format, compare, typing, writing.	NCCE Creating media – digital writing https://teachcomputing.org/curriculum/key-stage-1/creating-media-digital-writing Hardware/software requirements: Word processing software (eg: Microsoft Word)
Computational Thinking: - Understanding and using algorithms - De-bugging - Abstraction - Decomposition - Pattern recognition	Key Knowledge	Skills/Learning Checkpoints	Vocabulary	Ideas for Great Task Design
	Introduction to algorithms Algorithms: - An algorithm is a series of set of instructions - Know the sequence of an algorithm is important De-bugging Debugging is identifying and removing errors from an algorithm. Abstraction: - Abstraction is taking out instructions you do not need in an algorithm Decomposition: - Decomposition is solving a problem in smaller parts to make it easier Pattern & Recognition: - Know which parts of instructions/algorithms are similar and different	- I can predict, match and run an algorithm. - I can debug my program. - I can streamline my algorithm. - I can program my algorithm into manageable parts. - I can identify similar and different algorithms.	- Command - A single instruction that can be used in a program to control a computer - Computer - A programmable machine that accepts and processes inputs and produces outputs (input, process, output; IPO) - Algorithm - A precise set of ordered steps that can be followed by a human and implemented on a computer to achieve a task - Program - A set of ordered commands that can be run by a computer to complete a task - Programming - the process of writing commands (coding) - Run - To action the commands in a program - Sprite - a 2-D image in a programme - Reset - to start again/to clear any errors	NCCE Programming A – A robot https://teachcomputing.org/curriculum/key-stage-1/programming-a-moving-a-robot NCCE Programming B -Programming animations https://teachcomputing.org/curriculum/key-stage-1/programming-b-introduction-to-animation Hardware/software requirements: Bee-bot robots Scratch Jr
	Technology should be used safely, respectfully, and responsibly. - Electronic safety (e-safety) incorporates: - Safe, respectful, responsible use of technology - Identifying dangers - Know where or who to contact if they have concerns			

Year 2 Key Concepts, Knowledge, Vocabulary and Skills

Key Concept				
Computer components and resultant hardware	Key Knowledge	Skills/Learning Checkpoints	Vocabulary	Ideas for Great Task Design
	- Recognise different types of computers used in schools - Know that a computer is part of information technology - Recognise the features of information technology - Recognise uses of information technology - Know how information technology benefits us - Recognise how rules for using IT can help us	- I can identify examples of computers - I can sort school IT by its purpose - I can discuss uses of IT - I can demonstrate how IT devices work together - I can explain how rules for IT help keep me safe - I can explain choices I make when using IT.	Information technology (IT), computer, barcode, scanner/scan	Computing systems and networks – IT around us https://teachcomputing.org/curriculum/key-stage-1/computing-systems-and-networks-it-around-us Hardware/software: Pupils will need access to either Google Slides or Microsoft PowerPoint for some of the activities in this unit.
Digital Literacy relates to having functional IT skills, which support the creation or presentation of content.	- Recognise that people, animals and objects can be described by attributes. - Know appropriate headings for tally charts and pictograms. - Know and identify why objects have been grouped by which attributes. - Recognise how information can be presented using a computer. - Know examples of why some information should not be shared.	- I can record data and compare totals in a tally chart. - I can use a computer to view data in different formats - I can use a tally chart to create a pictogram. - I can use a pictogram to answer 'more than/less than' questions. - I can draw conclusions from a pictogram. - I can use a computer program to present information in different ways.	more than, less than, most, least, common, popular, organise, data, object, tally chart, votes, total, pictogram, enter, data, compare, objects, count, explain, attribute, group, same, different, conclusion, block diagram, sharing	NCCE Data and information – Pictograms https://teachcomputing.org/curriculum/key-stage-1/data-and-information-pictograms Hardware/software: i2e pictogram and i2e chart
Digital Literacy relates to having functional IT skills, which support the creation or presentation of content.	- Recognise that some digital devices can capture images - Recognise that images can be saved and viewed - Know about what a 'good' image is - Know how an image can be improved - Know the effect of light on a photograph - Know that images can be changed after taking - Recognise that some images are not accurate	- I can use a device to take a photo - I can take photos in landscape and portrait - I can improve taking of a photograph - I can experiment with different light sources - I can use tools to change an image - I can identify real and distorted/changed images	music, quiet, loud, feelings, emotions, pattern, rhythm, pulse, pitch, tempo, rhythm, notes, create, emotion, beat, instrument, open, edit.	NCCE Creating media – digital photography https://teachcomputing.org/curriculum/key-stage-1/creating-media-digital-photography Hardware/software requirements: Suitable photo app (eg: Windows photo or inbuilt iPad camera and tools)
	- Know that computers can play sounds of different instruments - Know patterns can be represented in different ways - Recognise the different between playing music on a computer and on an instrument	- I can identify simple differences in music - I can create a follow a rhythmic pattern - I can use a computer to make a musical pattern - I can refine a made musical pattern - I can create music for a purpose - I can review and change work	device, camera, photograph, capture, image, digital, landscape, portrait, framing, subject, compose, light sources, flash, focus, background, editing, filter, format, framing, lighting,	NCCE Creating media – digital music https://teachcomputing.org/curriculum/key-stage-1/creating-media-making-music Hardware/software requirements: Chrome Music Lab
Computational Thinking: - Understanding and using algorithms - De-bugging - Abstraction - Decomposition - Pattern recognition	Key Knowledge	Skills/Learning Checkpoints	Vocabulary	Ideas for Great Task Design
	Knowing and exploring algorithms Algorithms: - An algorithm is a series of set of instructions - Know the sequence of an algorithm is important - Be aware algorithms can be represented in simple formats [flow chart, storyboards, and narrative text] De-bugging - Debugging is identifying and removing errors from an algorithm. Abstraction: - Abstraction is taking out instructions you do not need in an algorithm Decomposition: - Decomposition is solving a problem in smaller parts to make it easier Pattern & Recognition: - Know which parts of instructions/algorithms are similar and different	- I can program a computer algorithm to perform a specific task - I can check, debug and update my program - I can improve and add to a program (existing and ones I have created) - I can create sequenced / ordered parts of a program - I can make changes to programs (existing and ones I have created)	- Sequence – a series of instructions/commands - Algorithm - A precise set of ordered steps that can be followed by a human and implemented on a computer to achieve a task - Program - A set of ordered commands that can be run by a computer to complete a task - Debugging - The process of finding and correcting errors in a program - Decomposition - To break down a task into smaller, more achievable steps - Command - A single instruction that can be used in a program to control a computer - Run - To action the commands in a program - Sprite - a 2-D image in a programme - Code - The commands that a computer can run	NCCE Programming A – Robot algorithms https://teachcomputing.org/curriculum/key-stage-1/programming-a-robot-algorithms NCCE Programming B -Programming quizzes https://teachcomputing.org/curriculum/key-stage-1/programming-b-an-introduction-to-quizzes Hardware/software requirements: Bee-bot robots Scratch Jr
Technology should be used safely, respectfully, and responsibly.	Electronic safety (e-safety) incorporates: - Safe, respectful, responsible use of technology - Identifying dangers - Know where or who to contact if they have concerns			

Year 3 Key Concepts, Knowledge, Vocabulary and Skills

Key Concept	Key Knowledge	Skills/Learning Checkpoints	Vocabulary	Ideas for Great Task Design
Computer components and resultant hardware	- Recognise how a process acts on inputs - Recognise that an output is produced by a process. - Know that a digital device is made of several parts. - Recognise how computers can connect to each other - Recognise how computer systems change the way we work. - Know how a computer network operates.	- I can explain how digital devices function. - I can classify input and output devices - I can explain how digital devices are used for different activities. - I can explain how messages are passed through multiple connections. - I can demonstrate how information can be passed between devices. - I can name the parts of a computer network.	digital device, input, process, output, program, digital, non-digital, connection, network, switch, server, wireless access point, cables, sockets	NCCE Computing systems and networks – connecting computers https://teachcomputing.org/curriculum/key-stage-2/computing-systems-and-networks-connecting-computers Hardware/software: Lesson 3 – digital device with a painting application (dependant on school resources)
	- Identify questions with yes/no answers. - Know attributes to ask yes/no questions. - Recognise appropriate attributes to separate similar objects. - Know the use of a branching database. - Know real-world uses for branching databases - Recognise two levels of a branching database.	- I can create two groups of objects using one attribute. - I can arrange objects into a tree structure. - I can group objects using my own yes/no questions. - I can compare two branching database structures - I can create a physical branching database - I can create and test my own database following a plan	attribute, value, questions, table, objects, branching, database, objects, equal, even, separate, structure, compare, order, organise, selecting, information, decision tree	NCCE Data and information – branching databases https://teachcomputing.org/curriculum/key-stage-2/data-and-information-branching-databases Hardware/software: Free tools - https://www.i2e.com/jit5#branch
Digital Literacy relates to having functional IT skills, which support the creation or presentation of content.	- Know that an animation is made up of a sequence of images. - Recognise that a capturing device needs to be in a fixed position - Recognise that smaller movements create smoother animations - Know how different media is added to animations - Recognise how a project is exported then shared	- I can draw and create an animation flip book - I can predict and create movement - I can create a storyboard - I can use onion skinning to review and evaluate work - I can improve an animation - I can add other media to an animation	animation, flip book, stop frame, frame, sequence, image, photograph, setting, character, events, onion skinning, consistency, evaluation, delete, media, import, transition.	NCCE Creating media – stop-frame animation https://teachcomputing.org/curriculum/key-stage-2/creating-media-animation Hardware/software requirements: iMotion or Stop Motion Studio
	- Recognise how text and images are used together to convey information - Define landscape and portrait orientation - Recognise different layout options for different purposes - Recognise that DTP pages can be structured with placeholders - Recognise font styles are used for effect - Consider benefits of DTP applications	- I can explain difference between text and images to communicate information - I can edit text and layout - I can choose appropriate page settings - I can add content to publications - I can choose a suitable layout - I can compare work on a desktop to that completed by hand	text, images, advantages, disadvantages, communicate, font, style, landscape, portrait, orientation, placeholder, template, layout, content, desktop publishing, copy, paste, purpose, benefits	NCCE Creating media – desktop publishing https://teachcomputing.org/curriculum/key-stage-2/creating-media-desktop-publishing Hardware/software requirements: Canva
Computational Thinking: - Understanding and using algorithms - De-bugging - Abstraction - Decomposition - Pattern recognition	Key Knowledge Programming Algorithms: - Different algorithms work for different purposes; there are patterns - Programs are executed by following precise and unambiguous instructions - It is possible to predict, and test completed algorithms De-bugging - Debugging is necessary for all algorithms for a variety of situations - A systematic approach to debugging means describing, explaining and correcting errors Abstraction: - A sequence of events will have more important information - Information is not always needed for the sequence of events and so some instructions can be removed. Decomposition: - Decomposition can be explored without computers (unplugged activity): Visual representation, including mathematics can be used to solve problems. Pattern & Recognition: Patterns can be recognised and included within a program	- I can recognise (and use) algorithms being represented in different ways (e.g.: as blocks) - I can recognise, use and build a sequence of commands. - I can decide actions for each individual sprite in a program. - I can add various additional features to improve a program.	- Algorithm - A precise set of ordered steps that can be followed by a human and implemented on a computer to achieve a task - Bug – an unexpected problem in the code - Code - The commands that a computer can run - Commands - A single instruction that can be used in a program to control a computer - Debugging - The process of finding and correcting errors in a program - Programming - the process of writing commands (coding) - Run - To action the commands in a program - Sequence – a series of instructions/commands - Sprite - a 2-D image in a programme	NCCE Programming A – Sequencing sounds https://teachcomputing.org/curriculum/key-stage-2/programming-a-sequence-in-music NCCE Programming B – Events and actions in programs https://teachcomputing.org/curriculum/key-stage-2/programming-b-events-and-actions Hardware/software requirements: Scratch
Technology should be used safely, respectfully, and responsibly.	Electronic safety (e-safety) incorporates: - Safe, respectful, responsible use of technology - Identifying dangers - Know where or who to contact if they have concerns			

Year 4 Key Concepts, Knowledge, Vocabulary and Skills

Key Concept				
Computer components and resultant hardware	Key Knowledge	Skills/Learning Checkpoints	Vocabulary	Ideas for Great Task Design
	- Recognise how networks can connect to each other - Recognise what and how the world wide web is used - Know what content is on the internet and how it is created and owned - Recognise limitations, benefits, reliability and consequences of internet media	- I can describe how networks physically connect and share information - I can explain how networked devices make up the internet - I can explain how websites and media are used on the world wide web (www) - I can explain how content is added to the world wide web (www) - I can explain rules and content ownership on the world wide web (www) - I can evaluate content on the world wide web (www)	internet, network, router, security, switch, server, wireless access point (WAP), website, web page, web address, routing, web browser, World Wide Web, content, links, files, use, download, sharing, ownership, permission, information, accurate, honest, content, adverts	NCCE Computing systems and networks – the internet https://teachcomputing.org/curriculum/key-stage-2/computing-systems-and-networks-the-internet Hardware/software Digital device with internet access. Chrome Music Lab – for one lesson
	- Recognise how a table of data can answer questions - Recognise how data can be logged over time - Recognise that sensors are input devices and can be used for data collection - Recognise how data loggers capture ‘data points’ from sensors over time	- I can choose and identify data that can be gathered over time - I can use a digital device to collect data - I can explain the data I have captured - I can view, sort and explain data - I can plan and collect data using a data logger - I can interpret data and draw conclusions	data, table, layout, input device, sensor, logger, logging, data point, interval, analyse, dataset, import, export, logged, collection, review, conclusion	NCCE Data and information – data logging https://teachcomputing.org/curriculum/key-stage-2/data-and-information-data-logging Hardware/software Data Harvest Vu+ data logger EasySense2 App If you do not have access to data loggers, most of the unit can be completed using apps such as Arduino Science Journal, or via alternate devices such as micro:bits.
Digital Literacy relates to having functional IT skills, which support the creation or presentation of content.	Key Knowledge	Skills/Learning Checkpoints	Vocabulary	Ideas for Great Task Design
	- To identify that sound can be recorded - To identify that an input device is needed to record sound - To identify that an output device is needed to play audio - Recognise that recorded audio can be stored on a computer - Recognise that audio can be edited - Recognise that sound can be represented visually - Recognise that audio can be layered	- I can use a computer to record audio - I can re-record and improve audio - I can save a project and play appropriate content - I can review and improve audio independently - I can combine audio to enhance recordings - I can evaluate effects of audio	audio, microphone, speaker, headphones, input device, output device, sound, podcast, edit, trim, align, layer, import, record, playback, selection, load, save, export, MP3, evaluate, feedback	NCCE Creating media – audio production https://teachcomputing.org/curriculum/key-stage-2/creating-media-audio-editing Hardware/software requirements: Audacity or Garage Band (iPads), Twisted Wave or Audio Mass (Chromebooks)
	- Know how images can be edited, including: rotating, flipping, cropping, adjusted and filtered - Know how images can be cloned, copied, retouched and pasted - Know how different compositions (eg: text) can be added	- I can rotate and crop images - I can change colours in an image - I can use cloning in an image - I can copy between images - I can choose and combine suitable images - I can review images; combine image and text	image, edit, digital, crop, rotate, undo, save, adjustments, effects, colours, hue, saturation, sepia, vignette, image, retouch, clone, select, combine, made up, real, composite, cut, copy, paste, alter, background, foreground, zoom, undo, font.	NCCE Creating media – photo editing https://teachcomputing.org/curriculum/key-stage-2/creating-media-photo-editing Hardware/software requirements: iPaint/Pixlr/PhotoPea
Computational Thinking: - Understanding and using algorithms - De-bugging - Abstraction - Decomposition - Pattern recognition	Key Knowledge	Skills/Learning Checkpoints	Vocabulary	Ideas for Great Task Design
	Algorithms: - Understand that a program is a sequence of statements written in programming language - Algorithms for use when programming can become increasingly more precise - Remix existing code De-bugging - Being systematic and applying logical reasoning can assist in the detection and correction of errors in programs Abstraction: - Abstraction (removing of instructions) can help to focus on what is important in a design - Abstraction (removing of instructions) and pattern recognition can help to modify code Decomposition: - Decomposition can be explored without computers (unplugged activity): Visual representation, including mathematics can be used to solve problems Pattern & Recognition: - Procedures, pattern matching, and simple selection can be used in algorithms - Know that a computer can repeatedly call a procedure - A procedure is a set of coded instructions within the program - Patterns are similarities or characteristics that some of the problems share - Pattern recognition involves finding the similarities or patterns among small, decomposed problems that can help us solve more complex problems more efficiently	- I can use block and text-based programming (eg: Scratch, Logo). - I can identify and use loops (patterns) within programming. - I can choose which values to change within a loop. - I can predict outcomes in a program and develop it by debugging. - I can reuse code so more than one loop/sequence runs at the same time.	- Algorithm - a precise set of ordered steps that can be followed by a human and implemented - Animate – to create movement using a series of still images - Code – the commands that a computer can run - Code snippet – a section of code on a computer to achieve a task - Commands - a single instruction that can be used in a program to control a computer - Count-controlled loop – a set of instructions that repeats a set amount of times - Infinite loop – a set on instructions that repeats endlessly - Debugging - the process of finding and correcting errors in a program - Duplicate – to copy - Programming - the process of writing commands (coding) - Sprite – a 2-D image in a programme - Variable – a value that can change depending on instructions.	NCCE Programming A – Repetition in shapes https://teachcomputing.org/curriculum/key-stage-2/programming-a-repetition-in-shapes NCCE Programming B – Repetition in games https://teachcomputing.org/curriculum/key-stage-2/programming-b-repetition-in-games Hardware/software requirements: FMS Logo (free download) Or Turtle Academy (can be used on tablets/iPads) Scratch
Technology should be used safely, respectfully, and	Electronic safety (e-safety) incorporates: - Safe, respectful, responsible use of technology - Identifying dangers Know where or who to contact if they have concerns			

Year 5 Key Concepts, Knowledge, Vocabulary and Skills

Key Concept				
Computer components and resultant hardware	Key Knowledge	Skills/Learning Checkpoints	Vocabulary	Ideas for Great Task Design
	- Recognise that computers are connected to form IT systems - Recognise that data can be transferred between IT systems - Recognise inputs, processed and outputs in large IT systems - Recognise that search engines are examples of large IT systems - Recognise what search engines create, and how results are selected - Recognise limitations of search engines	- I can explain how computer systems are connected - I can explain the role of computer systems in daily life - I can use, refine and compare search engine results - I understand how search engines select results - I can explain rankings of search results - I can explain limitations of search engines and results	system, connection, digital, input, process, storage, output, search, search engine, refine, index, bot, ordering, links, algorithm, search engine optimisation (SEO), web crawler, content creator, selection, ranking	NCCE Computing systems and networks – systems and searching https://teachcomputing.org/curriculum/key-stage-2/computing-systems-and-networks-systems-and-searching Hardware/software A digital device with internet and search engine access
	- Recognise a computer can be used to organise data - Recognise how tools can be used to select data to answer questions and filter data - Recognise how AND and OR can be used to refine data selection - Recognise that computer programs can be used to visually compare data	- I can use a form to record information - I can compare paper and computer-based databases - I can group and sort data to answer questions - I can use multiple criteria to answer questions - I can use a program to compare data visually - I can use a real-world database	database, data, information, record, field, sort, order, group, search, value, criteria, graph, chart, axis, compare, filter, presentation	NCCE Data and information – flat-file databases https://teachcomputing.org/curriculum/key-stage-2/data-and-information-flat-file-databases Hardware/software: Digital device to access https://www.i2e.com/database/ https://www.i2e.com/data/examples/
Digital Literacy relates to having functional IT skills, which support the creation or presentation of content.	Key Knowledge	Skills/Learning Checkpoints	Vocabulary	Ideas for Great Task Design
	- Know features of video as a visual media format - Recognise which devices can and can't record video - Explain purpose of a storyboard - Identify how a video can be edited, explaining its limitations - Recognise the need to regularly review and edit a project - Recognise projects need to be exported to be shared	- I can identify and compare features of videos - I can use a digital device to record video - I can use a range of filming techniques - I can outline scenes of a video in a storyboard - I can improve, store, retrieve and export video - I can edit and evaluate a created video	drawing tools, object, toolbar, vector drawing, move, resize, colour, rotate, duplicate/copy, zoom, select, align, modify, layers, order, copy, paste, group, ungroup, reuse, reflection	NCCE Creating media – video production https://teachcomputing.org/curriculum/key-stage-2/creating-media-video-editing Hardware/software requirements: IPads/tablets for recording; iMovie or Canva video editor for editing of videos
	- Know that a vector drawing comprises different objects - Recognise the different layers of each object - Recognise that drawings can be scaled without an impact on quality - Recognise that objects can be modified in groups - Know that alignment and size guides can help consistency	- I can experiment with shape and line tools - I can identify, explain and move/resize and rotate objects - I can use different tools, including zoom and resize grids - I can change order of layers in a drawing - I can duplicate, group, ungroup and reuse objects - I can reflect and compare vector to freehand paint drawings.	video, audio, camera, talking head, panning, close up, video camera, microphone, lens, mid-range, long shot, moving subject, side by side, angle (high, low, normal), static, zoom, pan, tilt, storyboard, filming, review, import, split, trim, clip, edit, reshoot, delete, reorder, export, evaluate, share.	NCCE Creating media – vector graphics https://teachcomputing.org/curriculum/key-stage-2/creating-media-introduction-to-vector-graphics Hardware/software requirements: Google Drawings (Powerpoint can be used for adapted vector-style drawings)
Computational Thinking:	Key Knowledge	Skills/Learning Checkpoints	Vocabulary	Ideas for Great Task Design
- Understanding and using algorithms - De-bugging - Abstraction - Decomposition - Pattern recognition	Algorithms: - Write complex algorithms for a purpose, evaluate work, and identify errors - Include a sequence, selection, and repetition commands, combined with variables as required, to implement a design - The flow of a program refers to the sequence of the instructions in a program - Understand that websites can be altered by exploring the code beneath the site De-bugging - Being systematic and applying logical reasoning can assist in the detection and correction of errors in programs Abstraction: - Understanding abstraction (removing of instructions) can help to identify errors in code i.e. what has been removed accidentally or deliberately Decomposition: - Understand decomposition is and how it facilitates problem solving of increasing complex problems Pattern & Recognition: - Include patterns and selection to create specific outputs in algorithms. - Compare various programmes to identify commonalities / similarities. - A count-controlled loop repeats a series of one or more instructions until a determined number of repetitions of the loop/sequence has been completed - An infinite loop is a sequence of instructions in a computer program which loops endlessly, either due to the loop having no terminating condition - A conditional loop is a sequence of instructions in a computer program which repeats set of commands depending on the conditions set	- I can use previous learning to explore physical computing (eg: micro:bit). - I can connect and program components. - I can create, test and debug a project. - I can create, identify and modify conditions in a program. - I can use condition and selection to test and share my program with others.	- Algorithm - a precise set of ordered steps that can be followed by a human and implemented - Microcontroller – a self-contained microcomputer. Used to perform one specific job. - Components – Hardware - Condition – a state of something in the programme that's true or false - Conditional statement - used to make decisions in code based on whether a certain condition is true or false - Count-controlled loop - a set of instructions that repeats a set amount of times - Infinite loop - a set on instructions that repeats endlessly - Input – information provided to a computer (mouse clicks, keys on a keyboard) - Output – the result of an input - Debugging - the process of finding and correcting errors in a program - Programming - the process of writing commands (coding) - Operator - An operator is a character, or characters, that determine what action is to be performed or considered (= > < etc.) - Selection - Part of a program where if a condition is met, then a set of commands is run - Variable - a value that can change depending on instructions.	NCCE Programming A – Selection in physical computing https://teachcomputing.org/curriculum/key-stage-2/programming-a-selection-in-physical-computing NCCE Programming B -Selection in quizzes https://teachcomputing.org/curriculum/key-stage-2/programming-b-selection-in-quizzes Hardware/software requirements: Micro:bit/Crumble devices + Microsoft makecode Scratch
Technology should be used safely, respectfully, and responsibly.	Electronic safety (e-safety) incorporates: - Safe, respectful, responsible use of technology - Identifying dangers - Know where or who to contact if they have concerns			

Year 6 Key Concepts, Knowledge, Vocabulary and Skills

Key Concept				
Computer components and resultant hardware	Key Knowledge	Skills/Learning Checkpoints	Vocabulary	Ideas for Great Teaching
	• Recognise that data is transferred across networks • Recognise that connections provide access to shared files • Know that data is transferred in packets • Recognise that the internet allows collaboration and communication from different spaces • Know what types of media can be shared through the internet • Know that internet communication can be public or private	• I can explain how internet addresses are used • I can explain how data packets are used to transfer information • I can explain how media can be shared across the internet • I can identify different ways of working online • I can identify different ways of communicating over the internet • I can evaluate different methods of internet communication	communication, protocol, data, address, Internet Protocol (IP), Domain Name Server (DNS), packet, header, data payload, chat, explore, slide deck, reuse, remix, collaboration, internet, public, private, one-way, two-way, one-to-one, one-to-many	NCCE Computing systems and networks – communication and collaboration https://teachcomputing.org/curriculum/key-stage-2/computing-systems-and-networks-communication Hardware/software: Access to the internet. Lesson 3 Involves learners working collaboratively. Google slides
	• Recognise questions that can be answered with spreadsheet data • Know what an item of data is in a spreadsheet • Recognise how data type determines how a spreadsheet can process data • Recognise that formulas can be used to calculate data • Recognise that cells can be linked • Recognise that a cell’s value updates when the value in a linked cell is changed	• I can collect and enter data • I can chose an apply appropriate format to a cell • I can construct and use formulae in a spreadsheet • I can apply formulas to data • I can create a spreadsheet and apply formula • I can present data from a spreadsheet	data, collecting, table, structure, spreadsheet, cell, cell reference, data item, format, formula, calculation, spreadsheet, input, output, operation, range, duplicate, sigma, propose, question, data set, organised, chart, evaluate, results, sum, comparison, software, tools	NCCE Data and information – introduction to spreadsheets https://teachcomputing.org/curriculum/key-stage-2/computing-systems-and-networks-communication Hardware/software: Laptop or desktop computers which have access to a spreadsheet application. Google slides/Microsoft Excel
Digital Literacy relates to having functional IT skills, which support the creation or presentation of content.	Key Knowledge	Skills/Learning Checkpoints	Vocabulary	Ideas for Great Teaching
	• Recognise relationship between HTML and visual display • Recognise that web pages can contain different media types • Recognise that web pages are written by people • Recognise that hyperlinks make up a web page • Recognise components of a web layout • Know ownership (copyright) rights • Recognise the need to preview and navigation paths of pages • Recognise implications of linking content owned by others	• I can explore and discuss different websites • I can plan features of a webpage • I can find and use copyright-free images • I can add, preview and evaluate a webpage • I can create a webpage; describing and explaining navigation paths • I can create hyperlinks, recognising owned content	website, web page, browser, media, Hypertext Markup Language (HTML), logo, layout, header, media, purpose, copyright, fair use, home page, preview, evaluate, device, Google Sites, breadcrumb trail, navigation, hyperlink, subpage, evaluate, implication, external link, embed.	NCCE Creating media – web page creation https://teachcomputing.org/curriculum/key-stage-2/creating-media-web-page-creation Hardware/software requirements: Google sites, Microsoft Sway or Powerpoint (non-web-based version)
	• Know that 3-D models can be created on a computer • Recognise that they can be viewed from different perspectives • Know that tools can be used to manipulate models • Know how placeholders can be used to create holes in 3-D models	• I can add, view and move shapes • I can resize, lift/lower and recolour objects • I can rotate, group and duplicate objects • I can size, combine and place hold objects • I can plan and create a 3-D model	TinkerCAD, 2D, 3D, shapes, select, move, perspective, view, handles, resize, lift, lower, recolour, rotate, duplicate, group, cylinder, cube, cuboid, sphere, cone, prism, pyramid, placeholder, hollow, choose, combine, construct, evaluate, modify.	NCCE Creating media – 3D modelling https://teachcomputing.org/curriculum/key-stage-2/creating-media-3d-modelling Hardware/software requirements: TinkerCAD platform
Computational Thinking: • Understanding and using algorithms • De-bugging • Abstraction • Decomposition • Pattern recognition	Key Knowledge	Skills/Learning Checkpoints	Vocabulary	Ideas for Great Teaching
	Algorithms: • Increasingly complex algorithms are written for purpose • Generic code can be written for use across multiples projects • A variable are storage locations with assigned names (categories) that hold data that you can change or use later • Controllable device are ones which can be programmed and controlled De-bugging • Editing code contributes to unsuccessful and successful outputs and applications A software bug is an error in a programme that causes it to produce an incorrect or unexpected result. The elimination of software errors is called bug fixing A bug fix is a change to a system or product designed to handle a programming bug/glitch Abstraction: • Logical reasoning can help to explain how processes can be more efficient, reducing the number of potential steps needed in a program • Knowing abstraction is part of the planning process before creating algorithms Decomposition: • Use decomposition across a range of situations, to break down complex programs, making improvements where required Pattern & Recognition: • Recognise, and make use, of patterns across programming projects, identifying variables needed, and explain their uses in selection and repetition • A nested loop is a loop within a loop, an inner loop within the body of an outer one Iteration is the repetition of a process such as a loop	• I can use, modify and create variables within a project. • I can use different values in variables, predicting then testing these. • I can write increasingly complex algorithms, using variables to extend projects. • I can use abstraction/modifying to increase efficiency of a program. • I will use a range of approaches to debug programs.	• Algorithm - a precise set of ordered steps that can be followed by a human and implemented • Accelerometer – a device that detects acceleration • Code - the commands that a computer can run • Debugging - the process of writing commands (coding) • Event – an action carried by software • Programming - the process of writing commands (coding) • Input - information provided to a computer (mouse clicks, keys on a keyboard) • Process - A program, or part of a program, that is running on a computer • Output - the result of an input • Operator - An operator is a character, or characters, that determine what action is to be performed or considered (= > < etc.) • Set – an unordered collection of objects • Variable - a value that can change depending on instructions.	NCCE Programming A – Variables in games https://teachcomputing.org/curriculum/key-stage-2/programming-a-variables-in-games NCCE Programming B – Sensing movement https://teachcomputing.org/curriculum/key-stage-2/programming-b-sensing Hardware/software requirements: Scratch Micro:bit + Microsoft makecode
Technology should be used safely, respectfully, and responsibly.	Electronic safety (e-safety) incorporates: • Safe, respectful, responsible use of technology • Identifying dangers • Know where or who to contact if they have concerns			

